DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luinstra (GB 2221853 A) in view of Bartz et al. (US 5,494,003) and Harris (US 5,921,079).

Regarding claims 1 and 7, Luinstra discloses a fission reactor for a Claus plant (see abstract), comprising a boiler (1) lined with refractory material (page 4 lines 32-33), which comprises a combustion chamber (15) having an inflow opening (3) for a mixture of heating gas, air and acid gas containing H2S, a catalyst chamber (13) having a catalyst bed (13) of loose catalyst material (see page 5, lines 16-18 which discloses a catalyst bed comprised of particles), and an outflow-side chamber (7) having a gas outlet (7) for hot process gas containing elemental sulfur, wherein the boiler (1) is configured as a

horizontal cylindrical boiler (see Fig. 1), in which the combustion chamber (15), the catalyst chamber (13), and the outflow-side chamber (7) are disposed next to one another (see Fig. 1).

Luinstra teaches a catalyst chamber which is delimited on both sides, in the flow direction, by two wire screens (page 5, lines 16-18) which is in high temperature service, but fails to teach the catalyst chamber is delimited, on both sides, in the flow direction, by gas-permeable checker bricks containing elongated holes.

Bartz also discloses utilizing screens in high temperature service (col. 1 lines 29-33).

Bartz teaches using a perforated ceramic plate/checkered brick in place of a screen when used in high temperature service in order to improve durability and prevent the problems associated with screens in high temperature service such as warping (col. 2 lines 2-8).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the screens of Luinstra with the perforated ceramic plate/checkered brick of Bartz in order to improve durability and prevent the problems associated with screens in high temperature service such as warping.

Furthermore, Luinstra teaches a cylindrical reaction vessel in which a catalyst is place, but does not teach a mantle-side fill opening disposed between the gas-permeable checker bricks for introducing the catalyst bed wherein said mantle-side fill opening comprises a flange tube.

Harris also discloses a cylindrical reaction vessel in which a catalyst is placed (see abstract and Fig. 1).

Harris teaches a mantle side fill opening (55) which is sealed with a flange (57) and is placed in the shell in order to facilitate catalyst removal and replacement of the catalyst contained inside (col. 5 lines 26-330).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the mantle side fill opening and sealing flange of Harris to the apparatus modified Luinstra between the checker bricks in order to facilitate removal and replacement of the catalyst of Luinstra.

In addition, while Luinstra, as modified above, does not explicitly disclose that there are a plurality of gas-permeable checkered bricks on each side of the catalyst chamber, however, such a modification is nothing more than making the checker brick structure of modified Luinstra separable. In other words, for purposes of maintenance and assembly, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the checker bricks of modified Luinstra separable in order to facilitate removal of the checker bricks through the small openings of the fission reactor (see Fig. 1 of Luinstra which shows that a single checker brick on either side of the catalyst chamber (13) would not be able to be removed through the smaller openings on either end of the fission reactor).

Regarding claim 2, Luinstra further discloses the inflow opening (3) and the gas outlet (7) are disposed on opposite faces of the boiler (see Fig. 1).

4. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luinstra (GB 2221853 A) in view of Bartz et al. (US 5,494,003) and Harris (US 5,921,079) as applied to claim 1 above, and further in view of Wunderlich et al. (US 3,822,337).

Regarding claims 4 and 5, Luinstra teaches a fission reactor for a Claus plant, but fails to teach:

wherein on the circumference of the outflow-side chamber, a branch line lined with refractory material is connected, which opens into a process gas line adjacent to the boiler, in the opening region of the branch line, a valve body is disposed in adjustable manner, with which the amount flow of a hot gas stream that exits from the branch line can be regulated, and a cooler process gas passes through the process gas line, which cools the valve body and a setting device assigned to the valve body, and

wherein a waste heat boiler (4) is connected with the gas outlet (13), in which the hot process gas that exits from the boiler (9) is cooled for the condensation of elemental sulfur, and steam is generated, and wherein the branch line (16) opens into a process gas line (17) that is connected with the waste heat boiler (4) and passes the cooled process gas to a catalyst stage (5) of the Claus plant.

Wunderlich also discloses a fission reactor for a Claus plant (see abstract).

Wunderlich teaches a branch line (52) lined out from an outflow size of the discharge chamber (203a) and joins in with a process stream (at 215), with a valve body (54) where the amount of hot gas can be regulated and the cooler process gas passes through the process gas line (after a waste heat boiler 212) which generates steam, and passes the cooled process gas to a catalyst stage (Claus oven). Wunderlich teaches this configuration

in order to control the temperature of the process gas stream to make it suitable for the downstream Claus reaction processes (col. 7 lines 53-56 and col. 8 lines 72-75).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the branch line, valve and the waste heat boiler of Wunderlich to the fission reaction apparatus of modified Luinstra in order to control the temperature of the process gas stream to make it suitable for the downstream Claus reaction processes.

Regarding limitations recited in claim 4 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luinstra (GB 2221853 A) in view of Bartz et al. (US 5,494,003) and Harris (US 5,921,079) and Wunderlich et al. (US 3,822,337) as applied to claim 4 above, and further in view of Nobuhiro (JP 06-200354).

Regarding claim 6, Luinstra, as modified above, teaches a valve body and setting device which is used to regulate temperature in a hot environment, but does not go into specifics as to the structure of the actual valve. In other words, Luinstra does not explicitly disclose said valve body and said setting device consist of metallic material.

Nobuhiro also discloses a valve used in high temperature service.

Nobuhiro teaches constructing the valve of a metallic material (see abstract) in order to improve the valve strength at high temperatures as well as reducing fatigue of the material (see abstract).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to construct the valve body and setting device of modified Luinstra out of a metallic material (as taught by Nobuhiro) in order to improve the valve strength at high temperatures as well as reducing fatigue of the material.

Response to Arguments

6. Applicant's arguments filed 8/24/09 have been fully considered but they are not persuasive.

On page 7, Applicant argues that Luinstra teaches a rigid permeable catalyst structure that is comprised of a catalyst mat or a catalyst insert. As best understood, Applicant appears to be arguing that Luinstra does not teach the newly claimed 'loose' catalyst. The examiner respectfully disagrees with this argument. Luinstra clearly discloses several embodiments of the apparatus, some which include a solid monolithic catalyst, but also one that comprises catalyst particles retained between two screens (col. 5 lines 16-18). It is the examiner's position that the "rigid permeable catalyst structure" of Luinstra does not necessarily mean that the catalyst itself is rigid (such as a honeycomb structure or a monolithic structure), but rather than the catalyst STRUCTURE is rigid. So, in the embodiment mentioned above, Luinstra teaches loose particles held rigidly between two screens.

On pages 8 and 9, Applicant argues that Bartz is non-analogous art. In response to applicant's argument that Bartz is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Bartz teaches a solution to a screen's weakness when in high temperature service. As such, one of ordinary skill in the art would recognize that the screens in the high temperature combustion atmosphere of Luinstra would be subject to the same weakness as the screen in the high temperature service of Bartz. Having recognized this, one of ordinary skill in the art would have had motivation to remove the screens of Luinstra, and replace them with the more stable ceramic plate/checkered brick of Bartz.

On page 12, Applicant argues that Wunderlich does not teach a setup in which a cooler process gas flows through a process line and cools the valve body and setting device assigned to the valve body. The examiner notes that such limitations are directed toward a manner of operating the apparatus and do not confer patentability to an apparatus claim. In addition, for the sake of completely addressing Applicant's argument, the valve body will inherently cool when placed in the proximity of a cooler gas line (as illustrated in Fig. 3 of Wunderlich) due to thermal radiation.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

/Jennifer K. Michener/
Supervisory Patent Examiner, Art Unit 1795